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Addis Ababa, Ethiopia, January 1983

REPORT OF THE ECA/UNSO/UNEP/ETW REGIONAL WORKSHOP ON COMBATING DESERTIFICATION IN AFRICA

(Khartoum, Sudan, 23-28 October 1982)

E/ECA/ENV./7

I. ATTENDANCE AND ORGANIZATION OF WORK

1. The Regional Workshop on Combating Desertification in Africa was held at the Friendship Hall, Khartoum, the Sudan, from 28 to 31 October 1982. It was organized by ECA, UNSO, UNEP and ITTA in collaboration with the Ministry of Agriculture and Irrigation (National Co-ordinating Unit on Desertification Control) and the Institute of Environmental Studies of the University of Khartoum.

2. The Workshop was attended by representatives of the following State Members of the Economic Commission for Africa: Angola, Benin, Botswana, Chad, Ethiopia, Guinea, Guinea-Bissau, Malawi, Nigeria, Senegal, the Sudan, the United Republic of Tanzania and Zimbabwe.

3. The following United Nations organs, organizations and bodies were represented at the meeting: the United Nations Sudano-Sahelian Office (UNSO), the United Nations Environment Programme (UNEP), the Food and Agriculture Organization (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO).

4. The following organizations were also represented at the meeting: the USAID-sponsored Environmental Training and Management Programme for Africa (ETMA) and the Institute for Environmental Studies of the University of Khartoum.

5. The following officers were elected:

Chairman:	Mr. Mustafa Mogali Institute of Environmental Studies University of Khartoum
Rapporteur:	Mr. Lalan Anderson Chilvunde Chaya Ministry of Agriculture Malawi
	Mr. Djidjourbion Darcoum Water and Forestry Department Chad

II. AGENDA

6. The Regional Workshop adopted the following agenda as contained in document ENV./Inf.1:

1. Official opening
2. Election of officers
3. Adoption of the provisional agenda and programme of work for the workshop
4. Plenary sessions for panel discussions on desertification control: Problems and successes
5. Group discussions of case studies, country reports and field trip
6. Plenary session - Recommendations
7. Plenary session - Adoption of the report and closure of the meeting

7. Certain amendments were made to the provisional annotated agenda (CNV./Inf.2) to reflect the correct titles of the discussion topics.

8. The provisional Programme for Work (CNV./Inf.3) was adopted after certain amendments.

C. ACCOUNT OF PROCEEDINGS

Opening addresses

9. The representative of the Executive Secretary of ECA stated that the Regional Workshop was a co-operative effort to assess activities in combating desertification in two sub-regions in Africa, namely the Sudano-Sahelian region covering 19 countries and the Kalahari Desert region covering 10 countries which were affected by drought and desertification. He regretted that the five northern Saharan countries were not represented here because of limited funding, but provisions had now been made under ECA Conference of Ministers resolution 446 (XVII) to establish a Regional Intergovernmental Committee to Combat Desertification which would involve exchange of experiences and information among all 34 affected countries in the ECA region. The workshop would evaluate specific case studies and country experiences, examine the difficulties encountered and develop strategies to make use of successful activities to enhance the national capabilities of member States to combat desertification. Emphasis would be placed on field work and experience in daily work in the rural environment, culminating in a day's field trip organised by the Institute of Environmental Studies of the University of Khartoum. He hoped that the workshop report would provide inputs on regional training activities in Africa for the Global Workshop being organized by UNEP at UNESCO, Paris, on specific anti-desertification training and research programmes.

10. The representative of the Environmental Training and Management Programme for Africa stated that ETMA was a project supported by the United States Agency for International Development in which a group of American universities assisted African Universities and governmental agencies through seminars and environmental management studies. ETMA was responsive to local needs and priorities and worked with or through local participants and scientists. In that spirit, ETMA was assisting the conveners of the Workshop.

11. The representative of UNEP, after welcoming participants on behalf of Mr. M.K. Tolba, Executive Director of UNEP, gave a short account of the rise of world-wide awareness of the problem of land degradation and desertification. The Sudano-Sahelian drought of 1968-1974 had played an important role in stimulating and co-ordinating the activities of the United Nations system to control desertification world-wide. Activities had culminated in the convening of the United Nations Conference on Desertification in 1977, and the adoption of the United Nations Plan of Action to Combat Desertification by that Conference. Within the framework of the recommendations of the Plan of Action for immediate action, the United Nations regional commissions were required to convene technical workshops on the implementation of the Plan of Action at the regional level and to define regional programmes more precisely. The present workshop was an initial step in that direction which would mark a turning point in containing the threat of desertification in the African region.

12. The representative of UNESCO, who was involved with the Integrated Programme on Arid Lands (IPAL) in northern Kenya, stated that the Man and the Biosphere (MAB)

Programme, which had its secretariat at UNESCO headquarters in Paris, was concerned with all aspects of human ecology. A major activity of MAB was the study of arid land grazing ecosystems, the changes taking place within them, and all possible management measures to control land degradation. One of those studies was the on-going Integrated Project in Arid Lands in northern Kenya's sub-desert country. UNESCO had a great interest in the objectives of the Workshop and its finding. On behalf of UNESCO, he wished the meeting every success.

13. The representative of the United Nations Sudano-Sahelian Office (UNSO) conveyed the greetings of UNSO's Director and expressed his pleasure at attending the meeting which dealt with one of the most serious problems facing Africa today. The 19 countries in the Sudano-Sahelian and adjacent regions assisted by UNSO, on behalf of UNEP, were Benin, Cape Verde, Chad, Djibouti, Ethiopia, the Gambia, Guinea, Guinea-Bissau, Kenya, Mali, Mauritania, the Niger, Nigeria, Senegal, Somalia, the Sudan, Uganda, the United Republic of Cameroon and the Upper Volta, located south of the Sahara and north of the equator (from the Atlantic to the Indian Ocean and Red Sea). Those countries had extensive areas of arid and semi-arid lands with fragile ecosystems whose equilibrium had been badly so upset as to cause desertification. In Guinea and Guinea-Bissau, although a wet climate prevailed in the greater part of the countries, land degradation was now threatening the Foutah Djallon massif located in Guinea with outliers in Guinea-Bissau, through deforestation of the watershed forming the principal source of the Gambia, the Niger, the Senegal and other rivers, thus adversely affecting the ecology of the western Sahel. He looked forward to a useful exchange of information and ideas among the various representatives present both from the Sudano-Sahelian and the Kalahari desert regions. He hoped that the meeting would come up with concrete, positive proposals for action to combat desertification in Africa which would be implemented in the countries concerned.

14. The Vice-Chancellor of the University of Khartoum, after welcoming the various organizations and participants, stressed the need to promote national, regional, and international co-operation, during the deliberations of the Workshop. He also stressed the role of the Institute of Environmental Studies in national and regional research and environmental training, not only for regional land ecosystems, but also for urban, fresh water and coastal ecosystems.

15. In declaring the Regional Workshop on Combating Desertification in Africa opened, his Excellency Soughiaroun Elzein, Minister of Agriculture and Irrigation of the Government of the Sudan, said that desertification was a serious problem in the Sudan which threatened agriculture, animal husbandry and forestry. The Government had adopted a national Plan of Action to Combat Desertification, based on the premise that desertification was a consequence of man's activities and that man could change his ways to his and to society's benefit. Finally, he expressed the hope that the seminar would focus on regional as well as international approaches to solve the desertification problem, and he wished the Workshop every success.

1. Plenary session: Panel discussions (item 4)

Panel I: Successful experiences in combating desertification

(a) Activities of UNEP relating to the implementation of the United Nations Plan of Action to Combat Desertification

16. The representative of UNEP presented a paper on the activities of his organization relating to the implementation of the United Nations Plan of Action to Combat Desertifica-

tion in the African region. He summarized the recommendations of the Plan of Action for long-term and for immediate action at the national, regional and international levels, and explained what institutional and complementary activities had been undertaken. Desertification Branch had been established within the secretariat of UNEP; and the United Nations Sudano-Sahelian Office (UNSO) had been given the additional mandate of providing assistance, on behalf of UNEP, to 19 Sudano-Sahelian countries in their efforts to combat desertification, under a joint UNDP/UNEP venture.

17. UNEP has organized and co-ordinated a number of joint projects at the international and regional levels. The project on "Ecological monitoring of arid and semi-arid rangelands of Africa and the Middle East" (FAO/EMASAR), the Integrated Project in Arid Lands (UNESCO/IPAL) executed by UNESCO, the North African Green-belt Project, the Transnational Project on the Management of Major Regional Aquifers in North-East Africa, the joint UNEP/USSR projects on international desertification training courses and combating desertification through integrated development, the UNEP/China project on desertification assessment and mapping were mentioned and information was given on the participation of African countries in those projects.

18. UNEP had also provided technical assistance to some of the African countries, upon the requests of Governments, to formulate national plans of action to combat desertification and to plan specific anti-desertification projects. At present UNEP was in the process of preparing a general assessment for 1984 on progress in the implementation of the Desertification Conference Plan of Action since its approval by the General Assembly in December 1977.

19. UNEP was also preparing a project in compliance with Governing Council decision 10/18, para. 5, to facilitate the exchange of information and expertise among the countries of the Sudano-Sahelian region, and between them and the other countries of Africa in the field of desertification control. The comments and recommendations of the present workshop would be considered carefully by UNEP to develop the programme further.

(b) Effect of climate on drought and desertification

20. In the paper presented by WMO, the representative of that agency showed how the drought in the Sudano-Sahelian region had demonstrated the important role of climate, especially the level of rainfall, in the desertification processes. He explained that whereas drought was a generally sustained and regionally extensive occurrence of appreciably sub-normal water availability and was temporary, aridity was a permanent feature characterised by very low normal rainfall, barring drastic climatic changes. He mentioned the different types of drought, such as agricultural drought and stressed the importance of rainfall measurement as a means of assessing drought and desertification, especially in arid and semi-arid areas. Vegetation in arid and semi-arid areas was normally in a rather fragile ecological balance with the climate, until it was disturbed by man-made exploitations such as over-cultivation and over-grazing beyond which it was unable to recover.

21. He then discussed the weather and climate of the West African subregion and said that three major drought periods had been noticed in the twentieth century. They occurred in 1914-1919, 1939-1945 and 1968-1974.

22. He informed participants about the recent WMO research programmes to study the weather and climate of the area such as the GATE and FIGGE programmes as well as the

World Climate Programme. Finally, he described WMO's role as the executing agency for the AGRHYMET Programme created by the CILSS countries of the Sudano-Sahelian region and outlined the progress achieved so far.

(c) Progress towards the Goal of Desertification Control

23. The representative of UNESCO presented the case study of the Integrated Project in Arid Lands, established in 1976 by UNESCO within the MAB Programme. The project study area was 22,500 km^2 of subdesert and desert rangeland in the Marsabit district of northern Kenya, between Lake Turkana and the Marsabit mountain, inhabited by about 30,000 people. As the mean annual rainfall was 200 mm, no agriculture was practiced and the people subsisted mainly upon livestock.

24. The main objective of IPAL was to carry out research into the causes and effects of desert encroachment on subdesert rangelands. That would provide a body of information necessary for planning the management of the natural resources of the region. So far, the project had obtained qualitative data on the socio-economic causes of desertification in relation to the human populations as well as quantitative data on the ecology of the area with regard to climate, soils, vegetation, animal life and water resources, which were available as technical reports. When IPAL ended in 1984, two follow-up projects would be initiated, one on arid land management to make use of the recommendations of IPAL and the other would establish an Arid Land Institute to enhance research and training on, and monitoring of the desertification process.

25. He concluded by identifying the following constraints which had to be taken into account in any future management plans for desertification control:

(a) Failure to land in the vicinity of water supplies against over-exploitation;

(b) The lack of adequate livestock marketing facilities and the difficulty of relieving the high concentration of livestock in the vicinity of settlements as well as the urgent need to restore a measure of livestock mobility which had been lost in recent years with the continuous reduction in nomadism;

(c) The lack of security against banditry and the means to insure pastoralists against the loss of their livestock through drought, diseases and raiding;

(d) The difficulty of finding suitable substitute material for the trees which were normally felled in large numbers for building livestock enclosures;

(e) The questionable acceptability among pastoralist people of recommended management practices, and the capability of Governments to provide the authority for implementing them;

(f) The very great difficulty of providing flexibility in management procedures including alternative forms of livelihood to animal husbandry, which would accommodate to the extreme variability of annual rainfall and the consequent variability in plant production and short-term livestock carrying capacities.

Discussions

26. The discussions on the above topics centred around the realisation that there had been no spectacular successes in the efforts of UNEP, UNESCO and WMO to combat desertifica-

tion in Africa apart from gaining recognition of the magnitude of the problems involved. The UNESCO-MAB Integrated Project on Arid Land (IPAL) in northern Kenya had identified qualitative, socio-economic and cultural factors as well as quantitative factors based on biomass research on vegetation, livestock and wildlife, soil-water potential, human demography and settlement, which could lead to land degradation. Management plans had been proposed for the control of desertification in the area for implementation by the Government with the co-operation of the local population.

27. Several delegations requested more details on a presumed 30-year cycle of severe drought in the Sudano-Sahelian region as indicated by the occurrences in 1914-1919, 1939-1945 and 1969-1974 with minor fluctuations in rainfall still occurring until today. If the cycle was predictable, they wondered whether it was not possible for national and international efforts in combating desertification to be intensified up to an optimum level at the peak rainfall level in 1985 predicted by a 30-year cycle, at which point, better planning and management of the desertification process should maintain the level of development attained during the next severe drought. Also, mention was made of the possibility of using such other evidence as the hydrological cycle for river and lake levels over the decades as evidence for a 30-year cycle.

28. In response, the representative of WMO emphasized that the 30-year cycle of drought could not, at the moment, be confirmed from the meagre data available which extended over less than 100 years for many Sudano-Sahelian countries. The World Climate Programme, which was being organised by WMO with the International Council of Scientific Unions (ICSU), aimed at studying the general question of climatic change and variability. The UNESCO representative replied that, although droughts were unpredictable, they were at least unavoidable as they were components of arid and semi-arid land ecosystems, hence advance planning and insurance measures must be taken to alleviate their effects. In the Sudano-Sahelian region including the East African countries, two out of every three years showed below average rainfall. The ECA representative pointed out that the statistical distribution of rainfall in the arid Sahelian region (with 100-600 mm annual rainfall) and in the semi-arid Sudanian region (with 600-1200 mm annual rainfall) was highly skewed; it was not normal and it required a great number of observations to determine a pattern.

29. Another participant drew the attention of the workshop to the need to avoid fanciful, sophisticated projects whose methodology bore very little relationship to the everyday, practical problems that a local farmer in an arid environment had to solve for his existence. Such projects, he pointed out, only survived as long as external sources of financing continued; they collapsed when the Government took over. The UNESCO representative pointed out that, in the IPAL project, the research team lived with the local people, owned their own livestock and at times made use of that of the local farmers for trial experiments. The team was also accustomed to long day trekking from village to village, thus involving the local community in their efforts to combat desertification. In northern Kenya, land degradation from grassland to desert conditions had progressed very fast over the past 20 to 40 years according to local residents. The region had no future unless positive actions were taken now.

30. The representative of UNSO indicated that alternatives had to be sought to prevent the rapid acceleration of the desertification process through deforestation for fuelwood which supplied 80 per cent of the energy requirements in Africa. The representative of UNESCO suggested some alternatives such as (a) even distribution of human and livestock population to reduce pressure on the land in arid and semi-arid areas; (b) redistribution of water resources for the establishment of new settlements under

government control against over-grazing and deforestation; and (c) improved livestock marketing practices to promote restocking and alleviation of ecological stress on the carrying capacity of the land.

31. On the problem of the difficulties faced in the implementation of the Plan of Action to Combat Desertification, the representative of UNEP pointed out that some countries lacked enough understanding of the severity of the problem to give it a high priority in their development efforts. Also, there were financial constraints and lack of technological inputs and manpower training to combat desertification. One participant pointed out that the financial machinery itself was defective, as Governments preferred bilateral sources of financing through UNESCO, rather than contributing to the Special Fund of the United Nations for combating desertification.

32. The representative of FAO agreed that, for an effective understanding of the climatic aspects of drought and desertification control in Africa, the agro-meteorological network of stations in the Sudano-Sahelian region as well as in East African countries and those in the Kalahari desert region should be greatly extended and strengthened. UNSO's activities in combating desertification in Africa should also include all the above three subregions as requested for in UNGA resolution Conference of Ministers 'A' (XVII) of April 1983.

Panel II: Successful experiences in combating desertification

(a) Successes and opportunities in the Sudano-Sahelian region

33. The representative of UNSO described the scope and functions of his organisation in assisting 19 countries of the Sudano-Sahelian and adjacent regions. The Sudano-Sahelian region had low and irregular rainfall characterized by recurrent droughts. The region's aridity was due partly to its distance from the sea and its location within or near the world belts of sub-tropical anti-cyclones (latitudes 15° and 30° north and south of the Equator). The Sudano-Sahelian and related countries were probably the region most seriously affected by desertification in the world today. It was estimated that, in the last 50 years, 65 million hectares of once productive land had become desert, a process which was continuing at an alarming rate. Over 80 per cent was arid or semi-arid compared to 33 per cent for the world. The standard of living of the region's 212 million people was one of the lowest in the world, and economic growth rates were extremely low and, in some cases, negative.

34. UNSO's approach stressed that the projects should be formulated by the people themselves, and that they should make sense to the people in terms of improving their living standards and removing the constraints of the ecosystem in which they lived. UNSO was assisting integrated projects for desertification control which linked pasture management, water harvesting, agricultural activities as well as environmental protection.

35. Another important approach of UNSO consisted in assisting Governments in the preparation of national strategies for combating desertification. The programme included co-ordinated projects, policies and measures for ecologically-sound development for environmental protection and for the use of alternative or supplementary sources of energy to improve their livelihood. UNSO had also been developing feeder roads to help to bring remote areas to the mainstream of development and to deliver food to people and animals during periods of drought.

36. As for the problems and successes of UNSO, a major problem was Government execution of projects. Forty per cent of the total volume of project assistance was host Government executed, a policy encouraged by UNSO. While that had led to problems of inefficiency for lack of financial resources, facilities, manpower and experience by the host Governments, the experience and training gained by national personnel in project implementation could be one of the most valuable results of the programme. In the meantime, UNSO provided back-stopping through its Regional Office in Ouagadougou, UNDP resident representatives and the specialized agencies, for combating desertification in the Sudano-Sahelian region.

(b) FAO report on selected activities in arid and semi-arid lands

37. Several FAO programmes and field projects were concerned with the agricultural and forestry development problems of arid and semi-arid land. Many of the activities of the organisation related to the implementation of the United Nations Plan of Action to Combat Desertification fell within three major divisions: land and water development, range management and forestry. Co-ordination and information of desertification activities within FAO was accomplished by an Inter-departmental Working Group on Environment and Energy.

38. Among the activities carried out in the area of land and water by FAO were the preparation of a world map (1: 25,000,000) of areas affected and areas likely to be affected by the process of desertification, preparation of soil degradation maps of Africa north of the Equator and the Middle East showing present soil degradation and the risks of degradation, assessment of land resources by agro-ecological zones and assessment and mapping of desertified areas. FAO was also developing an internationally acceptable methodology for assessing those areas.

39. Within the area of range management, one of the major programmes addressing the desertification issue was the Ecological Management of Arid and Semi-Arid Rangeland (MARSAR) programme. The principal objective of that integrated field programme was to develop a national system of using, developing and improving arid and semi-arid grazing land resources that would lead to a long-term improvement of the standard of living for the people depending on that fragile ecosystem. FAO had also given strong support to monitoring rangeland conditions and trends involving livestock production, natural grasslands improvement including fodder crops, fodder trees, wildlife, watershed management and other forms of agriculture.

40. FAO had always given particular attention to the forestry problems of arid lands. Much of FAO's recent work on forestry had had considerable influence in drawing attention to and analysing the fuelwood crisis. The activities in that regard were now concentrated in the new programme on forestry for rural development.

41. FAO was convinced that successful programmes in desertification control must be of an integrated and interdisciplinary nature, fall within an overall framework of rural development, have maximum participation of the inhabitants of the areas concerned, have strong elements of training at all levels and be based on an understanding of the ecological system and prevailing social factors.

(c) Climatic change and environmental degradation in the Sahel: a historical perspective

42. The representative of UNEA was concerned with climatic change and environmental degradation in the African Sahel. Although the Sahel region was variously defined,

for the purposes of discussion, it was regarded as a zone roughly bounded by the 100 and 500 mm isohyets, extending from the Atlantic to the Indian Ocean.

43. For the last 2500 years, the Sahel had been subject to pronounced short-term and medium-term climatic fluctuations and high inter-annual variability. Livelihood patterns should be adapted to that variability and to the inevitability of drought. The existence of predictable climatic cycles was not sufficiently well established to incorporate such cycles into national development planning.

44. The Sahel could be subdivided into three phytogeographical zones: the sparsely vegetated Sahel-Saharan zone to the north, the Sahel proper and the more heavily vegetated Sudano-Sahelian lowerlands to the south. Selected aspects of the vegetational history of those zones were then discussed.

45. In exploring the impact of human activity upon Sahelian ecosystems, several agents of change were discussed: bush fires, the trans-Saharan trade, site preference for settlements, the gum arabic trade, agricultural expansion, the proliferation of cattle, wildlife losses with the introduction of advanced firearms, the development of modern transport networks, urbanization and the resettlement of nomads in rural areas.

46. An understanding of man's impact upon Sahelian ecosystems, as contrasted with the apparently less significant role of climatic instability, led to a greater range of options in designing reafforestation programmes. It was suggested that programmes in environmental rehabilitation should be undertaken through the direct involvement of the human populations so tragically affected by environmental degradation, and by a better understanding and by exploiting the dynamics of environmental systems to increase project impact.

Discussions

47. Several major points were brought out in the discussion on the three papers. An observer for USAID wanted to know what actions UNSO had taken to monitor climatic cycles especially now that drought conditions continued to persist. UNSO, however, stated that its mandate was to execute programmes on desertification control and that FAO had so far been undertaking monitoring activities in relation to climate and food production. It was, however, felt that FAO should be requested to undertake climatic monitoring programmes for desertification control in the future.

48. A second point raised by the Netherlands observer related to the deleterious effects of certain development activities. For example, feeder roads built by his Government in southern Sudan opened up new areas to depletion of the woodlands for fuelwood. Also, crop residues (peanut husks, corn stalks) and cow dung found as agricultural wastes in areas near water points, were used as fuel in forest-depleted areas. Those practices greatly impeded the biological cycle for the return of organic matter to the soil and that enhanced land degradation. UNSO was asked what precautionary steps were being taken to assist stricken areas lacking services and feeder roads, to facilitate supply of services during drought emergencies. In the Sudan, great damage had been done on new roads and areas opened up around waterpoints for desertification control. Thus, it was not enough to provide services, but rather there should be follow-up activities to ensure a better management of the roads and waterholes in fragile areas. At present, rational development plans were being drawn up which required strict conservation practices, to be enforced by the national government to prevent the overexploitation of arid-land resources.

49. A third point which received much attention was UNSO's activities regarding improved fuel-efficient stoves in the drought stricken zone, for the rational use of fuelwood resources. Current fuel usage in the Sudan was very wasteful: for instance, 90 per cent of fuelwood energy was lost through inefficient stoves. The need to provide fuel-efficient stoves for other areas was greatly felt, but it was pointed out that such facilities had often been abused and caution should be taken in introducing them.

50. In reply to a question concerning the continued decline of crop production in semi-arid areas, the FAO representative said that the decline might be due to a drop in the number of crops grown as well as to people switching from traditional crops to export crops, coupled with lack of resources for fertilizers. EPTA pointed out that environmental degradation had occurred in the Sahel region because of open field cultivation replacing the traditional forms of agriculture. Soil degradation was very difficult to prevent and it was time to encourage agro-forestry in those areas. The Sudanese representative also emphasized the need to prevent removal of trees from river banks and to reorganize land tenure system to enable the rotational cropping of trees in arid lands for their rejuvenation by coppicing (e.g. Eucalyptus and Acacia Senegal for gum arabic).

51. A fifth point raised was the degree to which FAO involved African universities in the various countries in mapping and monitoring of desertification and in testing methodologies for desertification control. The Sudan, for instance, had a great need for monitoring stations in the drought stricken areas. It was observed that FAO and UNESCO were involved in consultations with Governments for desertification assessment and management with the national universities concerned. It was felt, however, that there was a great need to involve universities in such project since they trained the specialists and technicians employed by the Governments.

52. A sixth point was raised by UNESCO/IHD on traditional forms of rain-fed agriculture in areas with precipitation of less than 300 mm annual rainfall. Those areas would almost inevitably suffer degradation and production would fall. It was vital that, in efforts to combat desertification, every attempt should be made to prevent agriculture from being practiced in the arid zones and only under strict management conditions should any form of pastoralism be practiced there.

53. Finally, ECA pointed out that very often aridity and drought gave rise to vicious cycle of events ranging from falling yields, poor cultivation practices, increased clearing of land to meet basic requirements which led to extensive areas of soil being exposed to sun scorching and wind erosion. Those actions removed both topsoil and seed reservoirs of grasses and shrubs, consequently preventing regeneration of any form of vegetation. It was because of such events that rational plans should be prepared for the development and maintenance of the areas under persistent drought conditions.

Panel III: Lessons learnt from case studies in combating desertification

(a) Joint ECA/UNESCO/UNEP mission to the Kalahari region, 2 June to 3 July 1982

54. A representative of the ECA secretariat said that one of the main objectives of the investigation was to bring the drought and desertification problem in the Kalahari desert region into the prospective of world attention and particularly into the framework of activities to implement the Plan of Action to Combat Desertification.

55. The Kalahari desert region had not received much attention because inter alia of the political situation that prevailed in the area whereby attention had been directed to the struggle for political liberation, and secondly, because of the vastness of the African Sahara (23 countries including the Arabian Gulf States), most of the activities had been centred around it.

56. The hardships of desert conditions, added to that of political problems, had hindered systematic action in all spheres of development in the Kalahari region. ECA had therefore sought financial support from the Swedish International Development Agency (SIDA) as well as expert support from UNEP and UNESCO. ECA had mounted a mission in the region to gather information that would provide the basis for international co-operation in managing the impact of drought and desertification in the Kalahari region.

57. The Kalahari desert lay behind the cold Benguela current that swept the coast of Namibia and Angola. It extended eastwards until it was arrested by the Mozambique escarpment that descended into the Indian Ocean. The east coast escarpment enjoyed a wetter climate because of the warm Mozambique current and most of the country received over 200 mm of rainfall.

58. Countries that were directly affected by the Kalahari desert were Angola, Botswana, Lesotho, Malawi, Mozambique (western parts), Swaziland, the United Republic of Tanzania, Zaire, Zambia and Zimbabwe. Of those countries, the mission had visited Botswana, Lesotho, Mozambique, Zimbabwe and the United Republic of Tanzania. Representatives of those countries then made general comments on the mission report as a result of which the ECA representative called attention to Conference of Ministers resolution 446(XVII) which mandated ECA to help African Governments set up a Regional Intergovernmental Committee on Combating Desertification in Africa which would act as an advisory group to the Commission in its desertification programming activities. The same resolution called for the establishment of an organ of the United Nations which with a similar mandate to UNSO, which would be responsible for desertification activities in the Kalahari desert region.

(b) Anti-desertification traditions in a settled community: the case of Sheikh El Sidig Village, White Nile Province, the Sudan

59. The representative of the Institute of Environmental Studies, University of Khartoum, presented a case study of a village in the Sudan that had traditionally respected the Acacia tortilis (Garr) tree, and as a result the villagers had been able to maintain a rich tree cover in a semi-arid region where all else was bare. The region was quite marginal in its physical resources with shallow, sandy soils and a scanty annual rainfall of about 200 mm from July to September. Domestic water generally came from shallow wells, varying between 60 and 90 feet in depth.

60. The vegetation of the area consisted mainly of four species of Acacia trees, of which Acacia tortilis was the most dominant on an ephemeral grass and herbaceous ground cover. The true density of Acacia tortilis in the village was quite high with an average crown coverage estimated at 25-30 per cent of the total area of the village and its surroundings and in certain areas as high as 80 per cent.

61. The main tribe in the Sheikh El Sidiq region was the Rufaiaat, which together with the Kawahla, and the Hassaniya, occupied the White Nile region, from south of El Dueim to north of Khor Abu Habeifi. The tribes were semi-settled, migrating to the western part of the Sudan with their animals during the rainy season. The village of Sheikh El

Sidi, was a camp site that had develo ed into a village in the early 1930s when Sheikh Sidi, religious leader, had settled his family into the area. Currently, there was about 2,000 persons living in the village out of a total population of 30,000 for the whole region.

62. The ecology of the region was based on livestock (goats, sheep and cattle), and cultivation. The villagers cultivated sorghum, millet and vegetables in several ecological zones separated by some distance. For instance, some cultivation took place right outside the village in the sandy flats of the White Nile, while other villagers went to the sandy loz region (west of the village in Kordofan Province) to cultivate millet. The pastoralists also moved their animals in several areas extending from the Acacia tortilis forest near the village to the loz area in Kordofan Province.

63. The main sources of domestic fuel in Sheikh El Sidi were wood and charcoal and occassionally animal dung. Wood was also used for construction. But, because of the traditions of the people and the enforcement of those traditions by a court of law, little wood was cut and used from local stands of trees. Only dead branches or fallen trees were used, and most of the villagers imported fuelwood from the northern Kordofan Province.

(c) Soil conservation and land use administration in the Kordofan Region

64. The Sudanese representative said that the problem of soil degradation and combating desertification in Kordofan Region had become very serious and needed immediate attention. From soil conservation studies in that region, it appeared that the soil was being lost at the rate of about 50-200 t/ha/year because of the cultivation of marginal lands, cutting down of trees for fuel and over-grazing. Rainfall varied greatly in the region and ranged between less than 100 to 400 mm per year, in Umbadir and Elobeid. By 1973, agricultural productivity was one fifth that of the average yield of 1961.

65. Unplanned water points and mafirs had created very difficult socio-economic problems. The area needed a comprehensive socio-economic study so that a scientific way of distributing water points, managing land use and soil conservation measures was developed. That would hopefully produce meaningful policies and programmes that would balance agricultural and range management needs and provide the region with a better standard of living. Local and international help was needed at least for the feasibility studies and programme development and time was needed for the soil to regain its natural capacity.

Discussions

66. The representative of Zimbabwe, commenting on the paper by the ECA secretariat, said that it was not only over-grazing that created desertified conditions in the Kalahari region, but also the effects of over-population and lack of proper land management. He felt that destocking the area was not the only answer and that proper land management could work. The representative of Botswana disagreed with the reasons given by the ECA secretariat as to why only lately had attention been paid to the Kalahari desert and promised to elaborate on that matter in his country report. However, he thanked SIDA and the United Nations organizations that had sponsored the mission to the Kalahari desert region.

67. The representative of UNSO stated that in the Western Sahel, there was an inter-governmental machinery (CILSS) to co-ordinate UNSO-type projects. He asked ECA whether

such an inter-governmental body existed in East Africa. The representative of ICA said that it might be possible for the Regional Inter-governmental Committee on Combating Desertification in Africa to assume that function when it was established. However, the representative of Zimbabwe noted that a recently formed inter-governmental group, the Southern African Development Co-ordination Conference (SADCC), was currently having a meeting on environmental problems. The members of that group were Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, the United Republic of Tanzania, Zimbabwe and Zambia.

68. The representative of Nigeria, in reference to the Sheikh El Sidig case study, asked about the planting efforts and alternatives fuel sources other than tree cutting. The representative of ILCA replied that there was no desertification problem in the village and no projects were being considered at present to look at alternative fuels. However, in the future, population pressures would cause desertification problems which could be avoided through specialization in raising animals.

69. The discussion revealed that, although the villagers at Sheikh El Sidig had conserved the Acacia woodlands through decades of tradition, the annual grass and herb cover was depleted through over-grazing. Also, in the near future, the demand for fuelwood and agricultural land might endanger the forests. It was also noted that the people of the village contributed to the desertification process in the Qoz lands in the Nordofan region and on the eastern bank of the Nile through fuelwood cutting. To prevent the present conservation system developed by the villagers from collapsing in the future, the people must be encouraged to embark on a programme of reforestation of depleted areas as well as on improved methods for animal raising for milk and meat within the limits of the carrying capacity of the land.

70. The observer for the Forestry Research Institute, the Sudan, suggested that research should be concentrated on identifying desert tree species that could withstand regular cutting through their ability to produce coppices. He also suggested the introduction of tree species such as Prosopis juliflora that required little moisture, withstood heavy grazing by goats and cutting for fuelwood and which provided shade for villagers and their cattle. The representative of the Sudanese Council of Churches stated that conservation of forests around villages should be extended to other communities. Those projects should be administered and executed locally, with the support of government laws and inputs (capital, equipment, seed), as well as non-governmental donors.

71. In response to a query raised by the representative of UNSO on the usefulness and potential cash value of the Jojoba plant in desertified areas in the Americas, the representative of Nigeria pointed out that he had attended a seminar on the cash value and usefulness of the Jojoba shrub for desertification control in Africa, in the Sudan in February 1982. He was still waiting for seeds to start trial planting in the arid lands in Nigeria. It was reported that trial planting on light soils with at least 250 mm of rainfall had already began in nurseries in the Sudan with seeds sent from the United States.

72. It was noted that experimental forest stations built enclosures around nurseries to protect tree saplings from animal grazing; otherwise the survival rate would be less than 30 per cent. However, the observer for the Gum Arabic Company, the Sudan pointed out the importance of using indigenous species for combating desertification as suggested in the Plan of Action.

2. Discussions on field trip, country reports and case studies (item 5)

(a) Field trip to Sheikh El Sidig village

73. In introducing the discussion on the field trip to Sheikh El Sidig village and surrounding countryside in the White Nile Province, the Sudan, the representative of UNESCO expressed the group's gratitude to the Institute of Environmental Sciences of the University of Khartoum and USAID/FIFA for organising the whole day field trip on Monday, 25 October 1982. He highlighted the following observations made during the field trip for discussion:

(a) The absence of vegetation and the state of soil degradation in the countryside bordering the River Nile, up to 30 km south of Khartoum. It was pointed out that the savanna woodland vegetation which existed previously around Khartoum, had been removed mainly for fuelwood and building materials, even beyond the 30 km perimeter. That exposed the bare sandy soil to wind and water erosion, leading to desertification as plant regeneration became impossible;

(b) Around the village of Sheikh El Sidig, Acacia tortilis woodland survived because of the traditional conservation practice of the villagers. In the open woodlands, there were no young trees or grass and herb cover as a result of heavy grazing. But, wherever there was a low fence protection of thorny brush wood built by the villagers, especially along the banks of the River Nile, there was a grass/herb cover with clumps of perennial grasses. Also there were several other tree species of Acacia (eg. A.albida) forming a dense shade which served as a community centre for the villagers;

(c) The fenced experimental plots in the Acacia tortilis woodlands protected young trees from goat-browsing. After some years, the native woodland would have a normal distribution of variously aged and sized trees with herbaceous/grass cover. It was pointed out that the indigenous Acacia tree species were slow-growing even under protection, and goat-browsing stunted tree growth. Hence, fenced experimental plots planted with exotic, fast-growing tree species as Prosopis chilensis, P. juliflora from India, the United States and South America were on trial in the area. Those desert tree species were showing encouraging growth rate of 3 to 4 metres in 2 to 3 years especially along the dry wadis or drainage channels in the sandy soil. If unprotected, the exotic young trees were completely destroyed by goat-browsing whilst the native Acacia tortilis only remained stunted until they overcame the goat-vulnerable stage below one metre high;

(d) The socio-economic conditions of the people of the village were then discussed. It was pointed out that even with their strong interest in conserving their woodlands through traditional practices with the legal backing of the elders and the government, there were certain constraints to the development of the region. The problems identified in their efforts to combat desertification around the village were:

(i) lack of arable flood plains of the Nile with the construction of the Gebel Aulia barrage in 1932;

(ii) theft of firewood from protected woodlands by villagers from across the Nile;

(iii) lack of financial resources, with little help from the Government.

74. In conclusion, the following recommendations emanated from the discussion on the field trip:

(a) The villagers had done a lot to conserve their vegetation through traditional customs and hence financial aid to develop their economy should be provided for fishing on the Nile and for irrigation of suitably fenced areas;

(b) The able-bodied young men in the village could be more productive through training in fishing and cultivation of irrigated areas;

(c) Research into the introduction of fast-growing exotic tree species to serve the fuelwood and other needs of the local population should be encouraged;

(d) The use of indigenous thorny scrub of Acacia tree species for fencing to prevent cattle grazing and goat-browsing was wasteful. Alternative material for fencing such as bamboo mats, sisal-hemp plants and others should be investigated;

(e) Protection of fenced areas in the surviving Acacia woodland would provide the seed bank for native trees, grasses and herbaceous species which could be used to regenerate the denuded desert soil.

(i) Country report summaries

(i) The Sudan - Joint afforestation project in the Nile Province

75. The project was being implemented jointly between the Government and the Sudanese Council of Churches to establish shelter belts and forest production blocks in irrigated areas. The project also demonstrated the role of forests in checking desert encroachment by providing shelter against wind and sun, preventing sand dune movements into agricultural land and irrigation canals and providing fodder for cattle, fuelwood, building materials and charcoal, as well as shade and comfort for man, cattle and wildlife, and employment for small-scale forestry workers. An evaluation of the joint project after five years (1977-1982) confirmed the usefulness of shelter belts in protecting agricultural irrigation schemes in arid lands.

(ii) Botswana - Implementation of an action plan to combat desertification

76. The problem of desertification centred around over-grazing and overstocking of livestock around water holes in a traditionally pastoral country. The following activities were being undertaken by the Government to implement the action plan:

(a) Under the tribal grazing land policy, ecologically-sound land use management practices which were also socially suitable and cost effective, had been introduced;

(b) Small dams for watering herds of up to 400 head of cattle, had been constructed for communal use and most villages now had piped water supply;

(c) An irrigation section had been established in the Ministry of Agriculture, and research into dryland farming and fixation of sand dunes was being promoted;

(d) Rural health centres and meteorological stations to monitor climate, vegetation changes and rangeland conditions were being expanded;

(e) A Drought Inter-ministorial Group to develop facilities to cope with drought; an operational renewable Energy Technology Centre, a Natural Resources Technical Committee to monitor natural resources utilization; and a training course in Environmental Sciences at the University College of Botswana were being set up.

(iii) Zimbabwe - Implementation of an action plan to combat desertification

77. About 42 per cent of the country designated as communal (formerly tribal trust) lands with 60 per cent of the population, suffered from environmental degradation (forest depletion and soil erosion) because of over-population and lack of pastoral land management. That was aggravated by widespread clearing of tree cover during the civil war. The newly independent nation had, therefore, instituted the following corrective measures:

(a) Designation of the first Saturday of December as National Tree Planting Day;

(b) Development of an extension programme to create environmental awareness in the rural population through the use of mobile training units;

(c) Launching of a rural afforestation programme by the Forestry Commission to establish tree nurseries fenced in by sisal hedge plants, for eventual production of woodlots of fast-growing exotic trees to provide fuelwood for the local population;

(d) Introduction of fuel-efficient local stoves for firewood and charcoal, both of which account for 55 per cent of current energy use, and of alternative sources of energy such as solar, wind power and biogas;

(e) Stabilizing of mine dumps with specific flora to prevent siltation of rivers, using similar techniques as for sand dune fixation even though Zimbabwe had no sand dunes.

(iv) Nigeria - Arid zone afforestation projects

78. The problems of desertification in Nigeria's arid lands, which lay beyond latitude 12° north, were attributed to over-grazing, bush burning, shifting cultivation and deforestation. The Federal Government had established a National Committee on Arid Zone Afforestation in 1976 to formulate policies, evolve a programme of action and to co-ordinate afforestation activities to rehabilitate the northern region. In five years, the Committee with the co-operation of the Forestry Divisions of the five States involved (Borno, Sokoto, Kano, Kaduna, Bauchi) had established about 100 nurseries producing about 15 million tree seedlings annually, 24 bore holes in nurseries requiring water supply, and ten fruit tree nurseries to encourage orchard plantations. The tree seedlings, posts and barbed wire for fencing wood lots were provided free to the local community. An extension service to inculcate a forestry sense in the local population had been organised with the aid of mobile cinema vans to distribute leaflets, posters, hand bills and flip charts in English and in four Nigerian languages to the arid land population. Future emphasis in the programme would be directed towards legislation for the protection of the environment, development of alternative energy sources to fuelwood and promotion of research into arid land problems.

(v) Senegal - Implementation of an action plan to combat desertification

79. The main causes of desertification in Senegal were attributed to (a) over-exploitation of the vegetation by man and cattle resulting in the depletion of woodlands up to 200 km around Dakar; and (b) dry land cultivation of the fragile soil aggravated by serious and extended periods of drought. It was pointed out that the Government of Senegal had recognized the "Saharization of the Sahel region" as early as 1972 and had drawn up an action plan to combat desertification up to the year 2020 which took account of the ecological consequences of all development projects. The long-term

...lls called for the construction of 13 dams to irrigate half a million hectares of ... lands for cotton and rice and for the reafforestation of about 2 per cent of the country. The Government was currently engaged in forestry development, irrigation agriculture, pastoralism and livestock production, water energy research, and hydraulic engineering for developing water resources in the Rift Valley area, with the co-operation of the Institute of Agricultural Research and the National Institute for Environmental Services.

(vi) Uganda Republic of Tanzania - Implementation of action plan to combat desertification.

50. It was pointed out that the main causes of desertification in the country were: (a) fuelwood collection for domestic use and for sale to people living ... (b) charcoal production, (c) over-grazing and over-cultivation, and (d) continuous cultivation of the arid areas with inappropriate fallow periods. The role of reforestation was to satisfy that the search for fuelwood and charcoal would not lead to further desertification. consumption of 30 cubic metres of fuelwood and charcoal, whilst the natural vegetation could only provide 1.5 cubic metres annually under forestry management. Hence, the deficit in energy resources could be met by reforestation for wood-fuel energy and use of alternative sources of energy (solar, wind and biogas). In 1973, a Ministry of Livestock had been set up and it was certain measures to halt and reverse land degradation caused by bush clearing to eradicate the tse-tse flies in cattle grazing areas. For example, sisal, cotton and trees were grown on the hill-slopes while food crops on degraded soils, and appropriate range grass-lands in the valleys. Fire was also used as a tool for range management, coupled with organized pastoralism, and land and water use management. Long-term projects undertaken by the Government were: (a) the Rufiji River basin scheme which now covered 1,500 square miles out of a potential 4,000 square miles under irrigation for agriculture, and (b) regional agricultural planning projects where the whole country was divided into five ecological regions with integrated land use management in ecosystem units such as watersheds, forests, rangelands which would involve the development of agriculture, forestry, animal husbandry, human settlements planning and employment opportunities in rural settings.

(vii) Sudan - Implementation of action plan to combat desertification.

51. Desertification affected the lower rainfall zones (about 100,000 square miles) in the northeastern part of the country where an arid climate existed and the soil was largely ... by wind and flash floods. A significant part of the 100,000 square miles, the climate was semi-arid in places but still ... The main causes of desertification identified in the country were over-grazing, deforestation, over-cultivation and lack of proper range management systems. At the onset of the UNSO mission in 1977 to assist Sudan in developing a national policy and action plan to combat desertification, all environmental matters including desertification and drought were co-ordinated by the Physical Planning Unit of the Office of the Central Planning Supreme Council. The following measures had been taken to combat desertification in the country as a result of the national policies formulated for environmental management: (a) development of environmental laws and regulations to control grazing of the 7 million livestock by erection of grazing enclosures and by the improvement of range management practices; (b) rehabilitation of denuded hillsides by reafforestation of such slopes with a gradient of over 30° range-lands on slopes of 10° - 30° gradient and terracing for agriculture on slopes with gradient below 10°, and (c) creation of an environmental education programme on desertification control to create public awareness of the problem.

(viii) Angola - Implementation of an action plan to combat desertification

52. In Angola, resources were lacking to implement a programme for combating desertification, especially for qualified personnel in the forestry section. The Angolan Association for the Environment had its first meeting in Luanda in order to plan for the establishment of the infrastructure necessary for a programme to combat desertification in the country. The meeting also recommended the mobilization of the masses to execute national projects such as reforestation of outskirts around coastal towns, organizing an annual tree planting day in each province and the creation of information diffusion centres for education for desertification control. Angola needed a lot of technical assistance from international organizations to overcome because of its late independence which had stressed development and manpower training. Urgent aid was required for a forest inventory survey project and for another on the conservation of the remaining forests.

(ix) Benin - Implementation of an action plan to combat desertification

53. Benin has a sub-tropical climate in the south, changing into a Sahelo-type climate in the northern provinces. The vegetation also ranges from humid semi-deciduous forest in the coastal area, through wooded savanna in the middle belt to semi-savanna in the north. Between 1959 and 1975, 30,000 hectares of wooded savanna had been reduced to 23,000 hectares through population pressure for fuelwood use and for cultivation. Most trees had died to desertification through soil erosion. Recent measures being taken to combat desertification included afforestation with agrisilviculture, soil regeneration using legumes and family bush plans and the use of fuel-efficient stoves for energy conservation. Recently, a commission for the preservation of the environment was formed by intellectuals to create forestry legislation and policies of reserves against illegal tree cutting and lumbering. Also voluntary groups (scouts, youth camps) ran a programme to create environmental awareness against deforestation practices.

(x) Guinea-Bissau - Implementation of an action plan to combat desertification

54. The country had dominated forests in the coastal south and dry woodlands in the north. Although the country could not now be said to be under a desertification stress, there was obvious environmental degradation of the fragile woodland ecosystem due to annual bush-burning, overgrazing by cattle, deforestation for firewood and farming, and even salinization of mangrove soil under cultivation in the south. Forests and woodlands still covered 71 per cent of the country. Re-afforestation programmes for setting up village woodlots were planned to relieve population pressure on forested vegetation, and agrisilvicultural practices were being tried in the livestock areas for improved land management. The national forestry service also lacked the financial resources and the trained manpower to continue programmes being implemented by international organizations, and hence urgently needed environmental training.

(xi) Malawi - Implementation of an action plan to combat desertification

55. Malawi was a land-locked country with land and inland lakes along the Rift Valley, an escarpment region and an upland plateau. The country had a tropical climate with annual rainfall ranging from 500 mm in parts of the Rift Valley (i.e. semi-arid) to over 1,750 mm in the humid hilly regions. As such, Malawi did not suffer from severe desertification problems, even though the country had been experiencing a recurring drought over the past three years affecting most of southern Africa. Land degradation

was common on the hilly slopes owing to over-population and over-stocking of livestock, and to deforestation for fuelwood and for cultivation on the marginal lands. Government action to improve conditions had concentrated on implementing (i) a National Rural Development Programme to increase agricultural input per unit area as well as to promote reafforestation of denuded hillslopes, (ii) a wood energy project to create village woodlots; (iii) a tree planting day programme involving the development of tree nurseries for indigenous and exotic fast-growing trees; (iv) an extension programme to create environmental awareness in the public and (v) the establishment of a National Committee for the Environment to ensure protection of the environment and the incorporation of environmental considerations into development projects.

(xii) Guinea - Implementation of an action plan to combat desertification

86. The country experienced a semi-arid climate above 10° north latitude in the wooded savanna region, although most of the country had dense tropical forests especially near the coast and on the Fouta Djallon highlands which formed the watershed for several large rivers in West Africa. However, the most serious threat was land degradation as a result of deforestation of the hillsides of the Fouta Djallon highlands which had a high population density of (50-100 per square kilometre). Over the past decade, 10 to 30 per cent of the forests had been permanently destroyed, causing water and wind erosion of the bare soils with the formation of lateritic hard pans. Also, in the semi-arid areas, over-grazing by cattle and bush fires were accelerating the desertification process. The Government had taken measures to incorporate strategies for combating desertification in its previous economic development plan for 1976-1980 and also in its current plan for 1981-1985. They involved a sub-regional co-operative programme with the Governments of Senegal, Mali, Sierra Leone and Guinea-Bissau for the integrated management of the Fouta Djallon massif to protect the watershed of the large West African rivers with the co-operation of international organizations such as UNSO, FAO, OAU and UNSCO. At the national level, a mass education programme on, as well as a review of, legislation for desertification control, were being promoted by the Government.

(xiii) Chad - Implementation of an action plan to combat desertification

87. Most of the country was arid to semi-arid. The main cause of desertification was identified as fuelwood exploitation in the savanna woodlands which were now depleted up to 35 km around N'djamena. Also, over-population in urban centres, over-grazing by cattle and annual bush fires coupled with recurrent drought, had accentuated the desertification process. The Government had taken several measures to combat desertification such as (i) the creation of green belts around N'djamena and other urban centres using eucalyptus and other drought resistant tree species; (ii) developing the production of gum arabic by planting Acacia Senegal trees in 2000 to 3000 hectare plantations for exploitation by the rural population; (iii) rational exploitation and management of woodlands to promote natural regeneration; (iv) exploitation of Acacia albida trees to regenerate mineral and organic fertility of soils used for growing cereals; (v) promotion of a national tree planting week to enhance reafforestation efforts.

(c) Discussions on the country reports

88. The discussions were centred around the following topics:

(a) Tse-tse fly control measures. Most participants agreed that the practice of cutting forest trees to eradicate tse-tse flies by the removal of their resting sites was inimical, leading towards large-scale deforestation and eventually soil erosion and

desertification. Alternative methods of tse-tse fly control involving the use of pesticides, excluding DDT, should be investigated. Also, it was noted that tse-tse fly control required co-operation with neighbouring States, so the United Republic of Tanzania would do well to cooperate with the Southern African Development Co-ordination Conference (SADCC) in solving that problem, especially for monitoring the wild animals hosts of tse-tse flies in national core reserves. The representative from UNESCO-FAO Integrated Project on Arid Lands (IPAL) mentioned the USAID report on tse-tse fly control in the United Republic of Tanzania, pointing out that, whatever measures were used, they must be followed by grazing control of livestock to prevent over-grazing as another cause of desertification linked with over-stocking.

(b) Rejuvenation of cultivated soils. One participant wanted information from Senegal on measures it had adopted to cope with erosion of the loosened sandy soil when groundnuts were harvested. The Senegalese participant pointed out that there was an ambitious programme to rejuvenate degraded soil with Acacia albida cover after groundnut harvesting. Besides, the discarded groundnut plant was left covering the top soil to prevent wind erosion;

(c) Shifting cultivation practice in arid lands. Several participants pointed out the dangers of shifting cultivation in arid areas; although it was in principle a good system in the tropics, the time span allowed for fallowing in the arid lands in Nigeria was so short (less than five years) that the soil never completely rejuvenated, and when farmers cultivated the fallow land, the soil was further impoverished. The problem of shifting cultivation was aggravated by soil loss and erosion during over-cultivation and there was need for international co-operation to control it in border areas. Other representatives commented on the need to establish national land use committees which could draw up appropriate land use policies for the rural areas involving the participation of the rural community, especially church and youth organisations;

(d) Exchange of research information. The need to exchange research information between countries on drought resistant tree species which were used in combating desertification was emphasized. Methods used in stabilizing mine dumps in Zimbabwe were discussed with considerable interest as the procedure was similar to sand dune stabilization. It was emphasized that local people should be involved in tree planting programmes for the care of the seedlings and the protection of the young trees;

(e) Destocking of cattle in arid lands. Another participant wanted information on the process of destocking cattle in the United Republic of Tanzania. It was replied that destocking was handled through the prevailing political system from the top to the grassroot level with a lot of debate and information exchange at each level. In areas where desertification effects were very serious, such a system had been used for resettlement of local populations in more favourable sites;

(f) Regional physical planning for desertification control. The Tanzanian participant pointed that the philosophy was a broadly based policy to investigate the carrying capacity of the land, water and other natural resources in an ecological unit, to support human and animal populations and to identify suitable development projects for the area;

(g) Control of bush fires. The representative of Senegal was congratulated on the length of time that the Government and people of Senegal had been involved in implementing measures to combat desertification, even before the drawing up of the Plan

of Action in Nairobi in 1977. On the question of what measures were taken to control bush fires, he said that government-promoted programmes as tree-planting weeks had already led to recognition of the value of conserving trees in forests and woodlands. That was further strengthened by training and provision of simple equipment by the Government to the local farmers and herdsmen to fight bush fires.

(h) Subregional co-operation for shared natural resources. One participant observed that subregional co-operation was needed between Ethiopia, the Sudan and Egypt to prevent silting of dams built on the river Nile and its tributaries arising from Ethiopia, especially from the erosion of volcanic soils deprived of their forest cover. A similar situation existed for the protection of the watershed of the rivers Niger, Senegal and Gambia on the Fouta Djallon highlands affecting Guinea, Mali, Guinea-Bissau, Sierra Leone and Sene-Gambia.

(i) Creating public awareness for desertification control. Several participants were interested in the process of creating public awareness about desertification control in the rural population, especially when it was realized that the 20 per cent of the population which lived in the rural areas in most African countries had no access to television, radio, newspapers or other mass communication systems. The Ethiopian participant pointed out that it was done through the help of extension workers in the local branches of peasant associations, especially on market days and during important festivals. The representative of Botswana also pointed out that information dissemination at the local level was always associated with consultations on the tribal land grazing policy for communal land use. One participant from the Sudan reported a similar system but emphasized that the extension workers aroused local interest in their activities by incorporating music and dancing into their audio-visual information awareness programmes. Also, annual agricultural shows provided good opportunities for government officials to exchange views with local farmers on desertification control. A participant from PTA pointed out the experimental use of television and micro-computers to produce a programmed message on desertification control to a village community.

(d) Case studies on desertification control

(i) Feasibility study on natural resources conservation in the Darfur region in the Sudan

89. A feasibility study for the utilization and management of natural resources in the Darfur region in the Sudan was carried out by the Ministry of Agriculture and Irrigation, the Sudan. The Darfur region lay in the western most part of the Sudan between latitudes 8°30' and 20° north, next to the Kordofan region. It covered an area of 508,000 square kilometres with a population of about three million. Three climatic zones were recognized, namely (i) the arid north above 16° N with 0 to 75 mm annual rainfall which sustained nomadic herdsmen raising camel and sheep at a carrying capacity of four animal units per square kilometre, (ii) the semi-arid sub-region (13° N - 16° N) with an annual rainfall of 75 to 300 mm which sustained shifting cultivation with low yields of groundnut and cereals at a carrying capacity of 10 animal units per square kilometres for cattle and camel; and (iii) the savanna woodland region in southern Darfur (9° N - 13° N) with an annual rainfall of 300 to 800 mm where crops were grown by mechanized farming in the moister areas and cattle, sheep, goats and camels were also raised at twice the carrying capacity of the northern semi-arid region.

90. The above analysis indicated the intricate relationship between the climate of the regions as determined mainly by rainfall variability, and the ecological carrying

capacity of the arid lands to sustain natural resources such as humans, food crops, cattle which were dependent on soil-water availability. The problem of combating desertification in the Darfur region centred on the fact that the northern area was totally non-productive with hardly any plant cover and with moving sand dunes, whilst in the more productive southern Darfur, the carrying capacity of the rangelands had been greatly exceeded by the large animal population of 4,200,000 animal units. A multi-disciplinary team of international experts was now required to find solutions to the problems identified in the feasibility study.

(ii) The significance of gum arabic in the Sudan

91. The case study on the significance of gum arabic in the Sudan was presented by the observer from the Gum Arabic Company. He discussed the economic importance of gum arabic production in relationship to agricultural and forestry practices in the Sudan, the ecological distribution and biological growth form of the gum tree Acacia Senegal in desertification control and the social benefits of the gum tree cultivation to traditional farmers.

92. The gum tree belt in the Sudan formed a natural buffer zone between the Sahel-Sahara desert in the north and the agriculturally productive tall grass savanna in the south. Hence, the destruction or misuse of the gum zone would lead to desert encroachment on agricultural land. The gum belt was found mostly on sandy, unstable soils which were highly vulnerable to erosion, but the gum trees effectively protected the fragile topsoil from wind erosion so that agricultural production was encouraged. By acting as a wind break to check desert encroachment through the movement of sand, the gum arabic trees encouraged the accumulation of organic matter in the sandy soil and the gum trees also increased the fertility of the soil by fixing nitrogen. Also, since the gum trees regenerated artificially by producing coppice shoots from the cut stumps left in the soil to form new trees, old gum arabic plantation trees could regenerate easily when cut down for farming or to collect forest products such as fuelwood, charcoal, bush fencing for farms or cattle kraal and round building poles.

93. The gum arabic cultivation cycle in the Sudan provided enormous socio-economic benefits to the subsistence farmers such as sustained income from the sale of gum collected during the slack period of farming activities in the dry months of summer, as well as providing employment during the idle summer period when farmers tended to migrate from the rural areas to the towns. The trade in gum arabic earned about 40 million Sudanese pounds in foreign currency to which must be added an estimated 30 million Sudanese pounds for the benefits derived from its forest products and for the increase in agricultural production derived from the protection and increase in fertility of the sandy soil by the gum belt. Gum arabic was a source of national wealth in the Sudan as the gum belt supported a dense population with an animal wealth estimated at 20 million heads of camel, cattle, sheep and goats. Hence, the Government had given high priority to restocking the gum belt and improvement of gum production, as the opportunity cost of neglecting the gum trees in their natural habitat was higher than the State could afford. Consequently, a number of development projects on gum arabic had been launched by the Government for sponsorship by the international donor community.

(iii) Environmental rehabilitation in Mauritania

94. A case study was presented by the participant from USAID's Environmental Training and Management Programme for Africa (ETMA) who had organized the Mauritania Environmental Workshop to enhance the sensitivity of government officials to the consequences of environmental degradation and to the need to formulate sound development projects

with international donors. To identify causes of degradation causing a breakdown of critical ecological processes, emphasis was placed on evidence from (i) historical research and fossil records of species of plants and animals that had existed in Mauritania, and (ii) ecological changes in species composition in relation to climate and major human events. It was pointed out that an understanding of those processes would provide opportunities to reverse environmental degradation through logical design of projects for development activities that would encourage environmental rehabilitation. Specific project proposals designed according to that methodology could then meet not only the environmental imperatives but also provide socio-economic incentives for their implementation by Mauritanian villagers and traditional social groups.

95. The following conclusions were drawn, based on the various and on other activities by the National Academy of Sciences of the United States of America in Mauritania.

(a) There appeared to be no irreversible environmental change that would prohibit carefully formulated revegetation activities, nor has there been climatic changes in recent times that would necessarily limit such activities;

(b) The degradation of the environment was largely attributable to human activity particularly the proliferation of cattle in Mauritania following the "pacification" of the country early in the twentieth century (including a two-fold increase, from around 1,250,000 to 2,500,000 in the 1960s). The problem had been intensified by recurrent drought;

(c) The reintroduction of greater species diversity was essential for long-range ecological stability. Species selection for economic and environmental development offered practical opportunities for achieving both economic self-sufficiency and environmental rehabilitation, thereby also re-establishing the ability of the various ecological provinces of the country to withstand further periods of drought.

96. It was suggested, in conclusion, that while traditional practices such as annual burning had caused widespread ecological change, the most severe problems in environmental degradation in Mauritania and the Sahel arose from the disturbance of ecological equilibria in response to new economic opportunities and by programmes of national development. While it was often supposed that changes must take place in the minds of rural population in order to arrest and reverse desertification, it was suggested that it was even more critical that national governments and donors consider more carefully the implications of their development efforts, and also take into account the adaptation of rural populations in formulating their development efforts.

(e) Discussion on the case studies

97. Discussions on the case studies presented by the Gum Arabic Company and by USAID/FFW centred on the importance of Acacia Senegal in the protection and rejuvenation of sandy soils for the control of desertification and in the potential of gum arabic as an agricultural crop for resettling nomads. Acacia Senegal had proved to be very useful in the Sudan and considerable studies had been done on the number of the species producing gum, their distribution, and potential as a tool for resettling the nomadic pastoralists. In the Sudan, studies had shown that yields from the gum belt could reach up to 1 kg/tree/year in healthy trees. The importance in soil nutrient recycling was also pointed out as observed in Mauritania and Senegal where other species of gum trees existed. In the Sudan, there were two main species namely, Acacia Senegal and Acacia Sayal. Participants wanted to know what chances of success does the Acacia Senegal had if introduced in the Kalahari region in Kenya as a tool for resettling the nomadic tribes.

It was pointed out that the tree grew in parts of Kenya but no knowledge of its existence in the Kalahari region could be confirmed. Its yield potential rapidly decreased with a reduction of the annual dry period, for instance, in the southern part of the Sudan gum production was relatively small.

96. Cultural practices include a 4 to 5 year crop rotation programme where a part of the farm with gum trees was coppiced and cultivated with cereals. When the regenerated gum trees were tapped for gum arabic for up to 15 years. In reply to a question on what problems were encountered during rotating with other crops and whether quality or quantity of production was affected, it was said that no research had been done along those lines, and yield levels were not taken into account either. However, observations showed better gum production during regrowth of the coppiced trees. With regard to disease attack or drought effects on gum trees, the representative of UNESCO inquired whether the cause of death of a number of gum trees he had seen in the Sudan in 1975 had been determined. He also pointed out that, from his experience, the main causes of death of gum trees was indiscriminate tapping by hired labour in the Sudan and premature old age of the trees for lack of coppicing as in Mauritania.

99. In conclusion, the discussion on gum trees species showed the importance of the tree in desertification control. Angola inquired whether it was possible to get some seeds from the Sudan; the response was that seeds were available only in limited amounts for research purposes only.

3. Plenary Session - Conclusions (item 5)

100. The Regional Workshop for Combating Desertification in Africa had indicated that the problem of desertification control was still present. The review of the activities of international organizations in assisting the member States in the Sudano-Sahelian zone and in the Kalahari desert region, had assisted in the assessment of the implementation status of the Plan of Action to Combat Desertification. The raw state of the desert and desertification processes were well illustrated during the field trip to the White Nile province, and the case studies and country reports had identified the difficulties and problems encountered by African countries in their attempts to formulate national strategies for, and in the actual implementation of the Plan of Action to Combat Desertification.

101. The Plan of Action came out with 28 recommendations for implementation at the national, regional and international levels. No attempt was made to duplicate that effort, but the workshop addressed itself to specific recommendations for immediate follow-up action in implementing the Plan of Action. The causes and effects of desertification had also been clearly identified at the 1977 United Nations Desertification Conference and they did not differ in any of the countries studied so far. In summary, deforestation by wood cutting for fuelwood and charcoal, over-grazing by cattle, goat browsing on desert shrubs, over-population and disruption of the system of shifting cultivation, poor irrigation management, all led to soil exposure and degradation or soil deterioration in salinity with climatic or physiological drought.

102. This workshop identified two urgent priority areas of concern, namely (i) shortage of trained manpower; and (ii) lack of adequate financial resources which hindered the efforts of African countries to combat desertification. Since most African countries suffering from drought and desertification belonged to the group of least developed countries, the shortage of trained specialists and technicians to plan and execute

desertification control projects was very acute. That was an opportunity to promote technical co-operation among developing countries (TCDC) whereby training fellowships could be provided under the ECA or the United Nations University fellowship programme for government-nominated desertification control field workers to pursue post-graduate courses at the Institute of Environmental Studies (IES) of the University of Khartoum or at any other similar institution in Africa.

103. For the mobilization of funds for desertification control projects in Africa, the Member States appreciated the efforts of the United Nations Sudano-Sahelian Office and other international organizations working in the other subregions affected in Africa. However, it was suggested that, since more international donors preferred bilateral arrangements rather than contributing to a special fund, African Governments must make positive approaches in that direction. Also, since those organizations had some funds for technical assistance in the planning and formulation of national projects for desertification control, Member States should make the request to them.

104. Other problem areas identified by the workshop requiring specific recommendations for action were:

(a) Need to establish national co-ordinating bodies for intersectoral and multidisciplinary linkages in projects and programmes to combat desertification;

(b) Strengthening of agro-meteorological networks in East and Southern Africa countries in order to ensure for a better assessment of drought forecasting in the whole continent, with UNDP support;

(c) Promotion of south-south dialogue for the exchange of information on desertification control by sharing experience and scientific literature, demonstration of successful case studies, exchange of nationals as experts under TCDC, and of public awareness material to promote local participation at the grass-root level in combating desertification;

(d) In enforcing desertification control measures, alternatives must be provided to enable the local population to comply with rules and regulations for conservation. For instance, the provision of alternative, non-conventional sources of energy (biogas, solar, wind, etc.) to arrest deforestation for fuelwood and charcoal, the provision of alternative means of livelihood when destocking of cattle was recommended to maintain the ecological carrying capacity of the land (i.e. gum arabic harvesting, fishing), ecologically-sound management of human settlements created as alternatives to nomadism of pastoralists in the Sahel.

4. Adoption of the report and closure of the meeting (item 7)

105. The draft report of the workshop was adopted after amendments. However, participants were also requested to send in any necessary corrections or further amendments within two weeks to ECA for incorporation into the final report.

106. The Minister of Agriculture and Irrigation closed the workshop by expressing his Government's appreciation to the various international organizations which had supported the workshop and made it possible for the participants from various African countries threatened by desertification and drought to come and discuss their common problems in the Sudan. The desert was encroaching on agricultural and pastoral land in the Sudan at the rate of 6 kilometres per year, so every African country must make efforts to develop and implement a national action plan to fight against desertification. Finally,

he implored Governments to pool their resources for regional co-operation in developing educational programmes, in making use of indigenous expertise and in seeking the aid of the local population to combat desertification in Africa.

107. In reply to the Minister's closing remarks, a representative of the ECA secretariat expressed the Workshop's gratitude to the Government of the Sudan for the importance it had attached to the Workshop on combating desertification in Africa. He requested the participants to pay particular attention to the recommendations adopted in order to derive maximum benefit from the Workshop. The representative of Zimbabwe, speaking on behalf of all participants, stated that he had gained very valuable experience about the problems of combating desertification in Africa at the Workshop. He hoped a similar one could be held in southern Africa, so that all could share the experience in that part of the continent.

D. RECOMMENDATIONS AND RESOLUTIONS

Recommendation 1. Institutional arrangements for desertification control in the Kalahari desert region

Participants from Africa south of the Equator, having seen activities being carried out in combating desertification in the Sudano-Sahelian zone, mindful of the persistent drought conditions prevailing in the region and in view of the urgency for countries in the region to monitor activities and execute programmes for desertification control, recommend, through the present Workshop, that programmes like those assisted by UNSO/UNDP and USAID/AFR/A and the United Nations specialized agencies in the Sudano-Sahelian region, be established and strengthened in the Kalahari desert region without delay. At the subregional level, the inter-governmental organisation, the Southern African Development Co-ordination Conference (SADCC) could form the basis for co-operating with UNSO in establishing a subregional office similar to that arranged by CILSS at Ouagadougou;

Recommendation 2. Programming and project formulation for desertification control

While some countries had drawn up plans aimed at combating desertification, it would be desirable if the United Nations organizations and ECA assisted member States which had not already done so, in drawing up national action plans; in devising systematic programming and project monitoring and evaluation to ensure that the projects listed in each country's action plans, actually took care of all aspects of environmental protection and improvement in the dry lands; and in identifying problems encountered in project execution with a view to eliminating them as soon as possible. It was, therefore, recommended that countries such as Nigeria that did not receive adequate aid or assistance in combating desertification should be considered for immediate assistance. Furthermore, the workshop requested that an interdisciplinary interagency team of experts led by UNSO, should carry out a survey of the northern Darfur region which had been most seriously affected by desertification in the Sudan, to identify solutions to the problems of combating desertification in the region;

Recommendation 3. Improvement of desertification control measures by provision of alternatives

To prevent deforestation of natural woodlands, government institutions should encourage assistance programmes involving the local inhabitants to

(a) Plant fast-growing exotic and appropriate native forest tree species for supplying fuelwood, charcoal, fodder and shelter;

(b) Utilize the other new and renewable sources of energy, such as solar, wind and biomass energy;

(c) Utilize biomass residues for energy supply, such as the cotton stalks, groundnut husks, molasses, bargasse and others;

(d) Use alternatives such as kerosene, LPG, and biogas for their energy needs so as to minimise the consumption of fuelwood;

(e) Modernize the kilns used in production of charcoal;

(f) Introduce modern fuel-efficient stoves;

(g) Undertake surveys of the requirements for fuelwood and residue-fuel resources in each country;

(h) Carry out a survey to estimate the sustainable forest and residual fuel resources.

United Nations organizations and other international organizations such as USAID/IDA, should participate in financing and planning special training courses for the departments which work on new and renewable resources of energy in African countries. The different African States should give high priority to integrated programmes including afforestation especially in the regions threatened by desertification.

Recommendation 4. Manpower training for desertification control

(a) The Workshop recommended to the organizers that a combined workshop on desertification control for all the three subregions in the African continent be held yearly and that the next workshop be held in Malawi;

(b) Since many countries suffered from lack of trained personnel, the Workshop called upon the appropriate United Nations and other world organizations to help in training African nationals in the field of conservation;

(c) Extension and mass education programmes in African countries should be strengthened through the supply of audio-visual aids and transport;

(d) Recognizing that some countries of the region had developed advanced methods of desert control under African conditions, the Workshop recommended that appropriate activities such as technical co-operation among developing countries (TCDC) be developed which would make it possible to share experience and knowledge with those African countries which did not have such expertise;

(e) The exchange of visits by the personnel involved in the control of desertification should be organized among African countries through the help of international organizations such as ECA, FAO, UNEP, UNSO, etc.

Recommendation 5. Financing of desertification control projects

(a) The Workshop noted that finance was a major factor limiting project execution in all the Sudano-Sahelian and southern African countries. While assistance was being sought from United Nations organizations, the Workshop recommended that African Governments should ensure that adequate budgetary allocations were made in support of

their anti-desertification programmes; they should also enlist bilateral sources of funding as developed countries preferred to deal directly with Governments;

(b) The Workshop recommends that funding agencies and fund mobilising agencies should pool resources to back projects on desertification i.e. integrate their efforts instead of each agency supporting a different project.

Recommendation 6. Control of over-grazing and development of alternative or supplementary livelihood systems

Although the destocking of herds may be a means of combating desertification, the workshop stressed that it was necessary to provide the pastoralist with alternative or supplementary livelihood systems where herds were reduced deliberately or because of drought and the disappearance of vegetative cover. Combating desertification, which was a form of environmental protection and enhancement, should, therefore, be accompanied by ecologically-sound development programmes. Those could include such schemes as:

(a) The planting of Acacia Senegal for the production of gum arabic to provide farmers with cash income;

(b) The introduction of fishing where possible;

(c) The development of other food production activities such as poultry raising and the construction of small earthen dams for rainfall harvesting to encourage small-scale vegetable farming;

(d) Research and pilot projects for grazing other drought-resistant plants with cash value, such as, jojoba and guayule;

(e) Creation of seasonal employment in gum collecting for farmers and marketing of cattle for destocking by nomads to prevent migration from the rural to the urban areas.

Recommendation 7. Extension of AGRHYMET network in Africa

The Workshop noted that, with the assistance of WMO and UNSO, national meteorological services in the Sudano-Sahelian region had been making efforts to establish and strengthen their networks of agro-meteorological stations. The Workshop recommended that such efforts should be continued and extended to other parts of Africa especially countries in northern Sahara and Kalahari desert areas in order to assess better drought occurrences in Africa and increase the potential for drought prediction.

Resolution 1. Regional co-operation in combating desertification in Africa

The Regional Workshop on Combating Desertification in Africa

Expressing its thanks to the Government of the Sudan for the hospitality it has extended to the participants in hosting the meeting,

Expressing its appreciation to the Economic Commission for Africa, the United Nations Sudano-Sahelian Office, the United Nations Environment Programme and the Environmental Training and Management Programme for Africa for the support they have extended towards the organization of the workshop,

Recognizing that the cutting of trees and woody shrubs and over-grazing are the major cause of desertification in Africa and that measures should be taken to reduce these activities,

Emphasizing that a reduction of these practices cannot be achieved without developmental measures for alternative or supplementary source of energy and livelihood systems to meet the energy and food requirements of the people,

Noting with appreciation the assistance which the United Nations Sudano-Sahelian Office has been providing the countries of the Sudano-Sahelian and adjacent regions in combating desertification through concrete projects and assistance in planning and programming,

Notes with appreciation the role being played by the Food and Agriculture Organization of the United Nations, the United Nations Educational, Scientific and Cultural Organization and the World Meteorological Organization in the Sudano-Sahelian region and other regions in Africa towards the implementation of the Plan of Action to Combat Desertification and in the fight against drought,

1. Urges that the Governing Councils of the United Nations Development Programme and the United Nations Environment Programme, the Economic and Social Council and the General Assembly seriously consider the inclusion of the United Republic of Tanzania in the scope of definition of the Sudano-Sahelian region and make it eligible to receive assistance, through the Sudano-Sahelian Office on behalf of the Environment Programme, in combating desertification;

2. Requests the relevant organs of the United Nations to expand the scope of the United Nations Sudano-Sahelian Office and establish a similar operation to assist the countries, members of the Southern African Development Co-ordination Conference, on behalf of the United Nations Environment Programme, in combating desertification including the problems of drought, in a similar manner to the way it is assisting the States members of the Permanent Inter-State Committee on Drought Control in the Sudano-Sahelian region.

Resolution 2. Exchange of information on desertification control

The Regional Workshop on Combating Desertification in Africa,

Recalling decision 10/18 paragraph 5 of the Governing Council of the United Nations Environment Programme and welcoming the efforts of the Programme to carry out a survey to prepare a directory of national and international institutions and specialists involved in training, research and implementation of anti-desertification activities

in Africa, in order to facilitate the process of exchange of information and expertise among the African countries threatened by desertification,

1. Urges the Governments of African countries to provide relevant information to the Environment Programme or to the Sudano-Sahelian Office, as appropriate, on institutions and specialists of their respective countries on desertification and drought,

2. Recommends that the participants draw to the attention of their Governments the importance of filling out the desertification questionnaires circulated by the Executive Director of the Environment Programme to assist him in undertaking an assessment of the progress in the implementation of the Plan of Action to Combat Desertification since its adoption in 1977 and in determining whether such anti-desertification measures have been effective or should be modified and what new measure should be undertaken.

E/ECA/ENV./7
Annex

A N N E X

LIST OF DOCUMENTS

1.	UNEP	Implementation of the United Nations Plan of Action to Combat Desertification in the African region.
2.	FAO	The role of climate on drought and desertification
3.	UNSO	Desertification in the Sudano-Sahelian and related countries problems and opportunities encountered by the United Nations Sudano-Sahelian Office
4.	FAO	Selected FAO activities in the field of arid and semi-arid lands
5.	UNEP	Environmental degradation in the Sahel - A historical perspective
6.	UNEP	Discussion paper on the Mauritanian green belt reafforestation project
7.	E/ECA/ENV/5	Report and recommendations of the joint UNEP/UNESCO/ECA mission to the Kalahari region - Botswana, Lesotho, Mozambique, the United Republic of Tanzania and Zimbabwe
8.		Anti-desertification traditions in a settled community: the case of Sheikh El Dinar village, White Nile Province, the Sudan

Country papers

9. Combating desertification in Botswana
10. Rapport sur la mise en oeuvre du plan d'action des Nations Unies pour combattre la désertification en République Populaire Révolutionnaire de Guinée
11. Country paper on desertification in Mauritania
12. Arid zone afforestation project in Algeria
13. Senegal - Country paper
14. Desertification control - The United Republic of Tanzania
15. Actions forestières entreprises au Tchad dans le cadre de la Lutte Contre la Désertification

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ANNEX II

ECONOMIC COMMISSION FOR AFRICA

ECA/UNSO/UNEP/ETMA/IES Regional Workshop on Combating Desertification in Africa

Khartoum, 23-30 October 1982

COMMISSION ECONOMIQUE POUR L'AFRIQUE

Seminaire par la CEA/UNSO/PNUE/ETMA/IES pour la lutte contre la desertification en Afrique

Khartoum, 23-30 Octobre 1982

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